

A large, stylized letter 'A' is formed using the characters 'S' and 'Y'. The 'S' characters are arranged in a grid-like pattern to form the left and right sides of the letter, while 'Y' characters form the central vertical stem and the horizontal crossbar. The overall shape is a bold, blocky 'A' that fills most of the page.

[illegible]



|      |     |   |
|------|-----|---|
| (2)  | 69  | DECLARATIONS                                      |
| (3)  | 116 | LOCK/UNLOCK PAGES IN WORKING SET/MEMORY           |
| (4)  | 255 | UNLOCK GLOBAL PAGE FROM WORKING SET               |
| (5)  | 292 | LOCK/UNLOCK SINGLE PAGE IN WORKING SET/MEMORY     |
| (7)  | 567 | SWAPLOCK - INTERFACE TO SWAPWSLE FROM LOCK/UNLOCK |
| (8)  | 597 | SWAPWSLE - SWAP WORKING SET LIST ENTRIES          |
| (10) | 695 | SCNWSLX - SCAN FOR WORKING SET LIST INDEX         |
| (12) | 770 | MMGSEXPSTACK - EXPAND THE KERNEL STACK            |

```
0000 1 .TITLE SYSLKWSET - LOCK/UNLOCK FROM WORKING SET/MEMORY
0000 2 .IDENT 'V04-000'
0000 3
0000 4 *****
0000 5
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0000 23
0000 24 *
0000 25 *****
0000 26
0000 27 ++
0000 28 FACILITY:
0000 29
0000 30 ABSTRACT:
0000 31
0000 32 ENVIRONMENT:
0000 33
0000 34 AUTHOR: PETER H. LIPMAN , CREATION DATE: 24-APR-78
0000 35
0000 36 MODIFIED BY:
0000 37
0000 38 V03-009 WMC0005 Wayne Cardoza 26-Feb-1984
0000 39 Support for resident global sections.
0000 40
0000 41 V03-008 WMC0004 Wayne Cardoza 28-Nov-1983
0000 42 Move kernel stack expansion WSL slots.
0000 43
0000 44 V03-007 WMC0003 Wayne Cardoza 13-Oct-1983
0000 45 Add support for expanding kernel stack.
0000 46
0000 47 V03-006 LJK0247 Lawrence J. Kenah 1-Sep-1983
0000 48 Remove fatal bugcheck when MMG$SCNWSLX fails. The global
0000 49 page was removed from the working set and should simply be
0000 50 faulted another time.
0000 51
0000 52 V03-005 TCM0001 Trudy C. Matthews 1-Apr-1983
0000 53 Change references to working set fields in PHD so that
0000 54 they are used as unsigned words.
0000 55
0000 56 V03-004 WMC0002 Wayne Cardoza 02-Mar-1983
0000 57 MMG$CRECOM1 HAS GONE AWAY
```



0000 58 :  
0000 59 :  
0000 60 :  
0000 61 :  
0000 62 :  
0000 63 :  
0000 64 :  
0000 65 :  
0000 66 :  
0000 67 :--

V03-003 WMC0001 Wayne Cardoza 29-Sep-1982  
Fix loop when trying to reduce working set to quota.

V03-002 KDM46395 Kathleen D. Morse 28-Jun-1982  
Check whether page table pages should be moved out  
of the locked portion of the working set when the  
PTWSLELCK byte array count goes to zero.

```
0000 69      .SBTTL DECLARATIONS
0000 70      :
0000 71      : INCLUDE FILES:
0000 72      :
0000 73      $IPLDEF      ;PROCESSOR PRIORITY LEVELS
0000 74      $MMGDEF      ; Offsets from FP into scratch area
0000 75      $OPDEF       ; Define opcode equivalent values
0000 76      $PCBDEF      ;PROCESS CONTROL BLOCK DEFINITIONS
0000 77      $PFNDEF      ;PAGE FRAME NUMBER DATA BASE
0000 78      $PHDDEF      ;PROCESS HEADER DEFINITIONS
0000 79      $PRDEF       ;PROCESSOR REGISTER DEFINITIONS
0000 80      $PRVDEF      ;PRIVILEGE BIT DEFINITIONS
0000 81      $PTEDEF      ;PAGE TABLE ENTRY DEFINITIONS
0000 82      $SSDEF       ;SYSTEM STATUS CODE DEFINITIONS
0000 83      $VADEF       ;VIRTUAL ADDRESS VIELDS
0000 84      $WQHDEF      ;WAIT QUEUE HEADER
0000 85      $WSLDEF      ;WORKING SET LIST ENTRY DEFINITIONS
0000 86      :
0000 87      : EXTERNAL SYMBOLS:
0000 88      :
0000 89      :
0000 90      : MACROS:
0000 91      :
0000 92      :
0000 93      : EQUATED SYMBOLS:
0000 94      :
0000 95      : OFFSET FROM AP
0000 96      :
00000004 0000 97      INADR      = 4      ;OFFSET TO INPUT RANGE
00000008 0000 98      RETADR     = 8      ;OFFSET TO RETURN RANGE
0000000C 0000 99      ACMODE     = 12     ;ACCESS MODE
0000 100     :
0000 101     : BIT DEFINITIONS IN R8 CONTROL LONG WORD
0000 102     :
0000 103     _VIELD LCK,8,<-
0000 104     <LCKPAG,,M>,-      ;SET IF LOCKING, CLEAR IF UNLOCKING
0000 105     <GLOBAL,,M>-      ;SET IF GLOBAL PAGE
0000 106     >
0000 107     :
0000 108     : OWN STORAGE:
0000 109     :
00000000 110     .PSECT $$$210, LONG
0000 111     :
0000 112     MMG$GL_PFNLOCK::
40000000 0000 113     .LONG 1a30      ;DOWN COUNTER OF PAGES REMAINING
0004 114     :                      ;THAT MAY BE LOCKED IN MEMORY
```



```
0004 116 .SBTTL LOCK/UNLOCK PAGES IN WORKING SET/MEMORY
0004 117 :++
0004 118 : FUNCTIONAL DESCRIPTION:
0004 119 :
0004 120 : THE LKWSET SYSTEM SERVICE LOCKS THE SPECIFIED RANGE OF PAGES
0004 121 : INTO THE WORKING SET. THE PAGES LOCKED ARE NO LONGER CANDIDATES
0004 122 : FOR PAGE REPLACEMENT AND ARE THUS GUARANTEED RESIDENT IN MEMORY WHEN
0004 123 : THE PROCESS IS IN THE BALANCE SET.
0004 124 : SINCE SOME REASONABLE NUMBER OF DYNAMIC PAGES IS REQUIRED IN ORDER
0004 125 : TO GUARANTEE THAT AN INSTRUCTION CAN RUN TO COMPLETION, THE NUMBER OF
0004 126 : PAGES THAT MAY BE LOCKED IN THE WORKING SET IS LIMITED.
0004 127 : THE ULWSET SYSTEM SERVICE UNLOCK THE PAGES FROM THE WORKING SET.
0004 128 :
0004 129 : CALLING SEQUENCE:
0004 130 :
0004 131 : CALLG ARGLIST,G^SYSS$LKWSET
0004 132 : CALLG ARGLIST,G^SYSS$ULWSET
0004 133 : CALLG ARGLIST,G^SYSS$LCKPAG
0004 134 : CALLG ARGLIST,G^SYSS$ULKPAG
0004 135 :
0004 136 : INPUT PARAMETERS:
0004 137 :
0004 138 : INADR(AP) = ADDRESS OF 2 LONG WORDS THE 1ST OF WHICH SPECIFIES
0004 139 : THE STARTING VIRTUAL ADDRESS TO LOCK/UNLOCK, THE 2ND SPECIFIES
0004 140 : THE ENDING VIRTUAL ADDRESS TO LOCK/UNLOCK (INCLUSIVE).
0004 141 : RETADR(AP) = ADDRESS OF A 2 LONGWORD ARRAY INTO WHICH IS RETURNED
0004 142 : THE STARTING AND ENDING VIRTUAL ADDRESSES (INCLUSIVE)
0004 143 : OF THE PAGES JUST LOCKED/UNLOCKED
0004 144 : ACMODE(AP) = THE ACCESS MODE (MAXIMIZED WITH CALLING MODE)
0004 145 : ON BEHALF OF WHICH THE LOCK/UNLOCK IS TO BE DONE
0004 146 : THIS MODE MUST BE AT LEAST AS PRIVILEGED AS THE MODE
0004 147 : OF THE PAGE OWNER.
0004 148 :
0004 149 : IMPLICIT INPUTS:
0004 150 :
0004 151 : NONE
0004 152 :
0004 153 : OUTPUT PARAMETERS:
0004 154 :
0004 155 : R0 = SYSTEM STATUS CODE
0004 156 :
0004 157 : IMPLICIT OUTPUTS:
0004 158 :
0004 159 : NONE
0004 160 :
0004 161 : COMPLETION CODES:
0004 162 :
0004 163 : SSS_WASSET ;PREVIOUS STATE OF LOCK WAS SET
0004 164 : SSS_WASCLR ;PREVIOUS STATE OF LOCK WAS CLEAR
0004 165 : SSS_ACCVIO ;ACCESS VIOLATION
0004 166 : SSS_NOPRIV ;NO PRIVILEGE TO LOCK/UNLOCK PAGE
0004 167 : SSS_LKWSETFUL ;LOCKED PORTION OF WORKING SET IS FULL
0004 168 : SSS_LCKPAGFUL ;NO MORE PAGES MAY BE LOCKED IN MEMORY
0004 169 : SSS_PAGOWNVIO ;PAGE OWNER VIOLATION
0004 170 :
0004 171 : SIDE EFFECTS:
0004 172 :
```



```
0004 173 : NONE
0004 174 :
0004 175 :--
0004 176 :
0004 177 :
0004 178 :*****
0004 179 :
0004 180 :***** THE FOLLOWING CODE MAY BE PAGED *****
0004 181 :
00000000 182 : .PSECT Y$EXEPAGED
0000 183 :
0000 184 :*****
0000 185 :
0000 186 : .ENABL LSB
0000 187 :
01FC 0000 188 : .ENTRY EXE$ULWSET,^M<R2,R3,R4,R5,R6,R7,R8>
0002 189 :
58 20 9A 0002 190 : MOVZBL #WSL$M_WSLOCK,R8 ;UNLOCKING FROM WORKING SET
05 11 0005 191 : BRB 10$
0007 192 :
01FC 0007 193 : .ENTRY EXE$ULKPAG,^M<R2,R3,R4,R5,R6,R7,R8>
0009 194 :
58 10 9A 0009 195 : MOVZBL #WSL$M_PFNLOCK,R8 ;UNLOCKING FROM MEMORY
50 09 3C 000C 196 10$: MOVZWL #SS$_WASSET,R0 ;INIT TO 'PAGES WERE LOCKED'
5E 1C C2 000F 197 : SUBL #-MMG$C_LENGTH,SP ;RESERVE SCRATCH AREA
0012 198 : SAVIPL ;SAVE CALLERS IPL FOR EXIT
27 11 0015 199 : BRB 30$
0017 200 :
01FC 0017 201 : .ENTRY EXE$LKWSET,^M<R2,R3,R4,R5,R6,R7,R8>
0019 202 :
58 20 9A 0019 203 : MOVZBL #WSL$M_WSLOCK,R8 ;LOCKING IN WORKING SET
0E 11 001C 204 : BRB 20$
001E 205 :
01FC 001E 206 : .ENTRY EXE$LCKPAG,^M<R2,R3,R4,R5,R6,R7,R8>
0020 207 :
50 24 3C 0020 208 : MOVZWL #SS$_NOPRIV,R0 ;ASSUME CANNOT LOCK PAGES IN MEMORY
0023 209 : IFNPRIV PSWAPM,45$ ;BRANCH IF CANNOT LOCK PAGES IN MEMORY?
58 10 9A 0029 210 : MOVZBL #WSL$M_PFNLOCK,R8 ;LOCKING IN MEMORY
5E 1C C2 002C 211 20$: SUBL #-MMG$C_LENGTH,SP ;RESERVE SCRATCH AREA
002F 212 : DSBINT #IPL$_ASTDEL ;PREVENT SYSTEM WORKING SET GROWTH AST
0035 213 : BSBB 50$ ;SET QUOTA WORKING SET SIZE BEFORE LOCK
50 01 3C 0037 214 25$: MOVZWL #SS$_WASCLR,R0 ;INIT TO 'PAGES WERE UNLOCKED'
00 58 08 E2 003A 215 : BBSS #LCK_V_LCKPAG,R8,30$ ;SET LOCK FLAG
56 00000011'EF DE 003E 216 30$: MOVAL MMG$C_RULKPAG,R6 ;ADDRESS OF PAGE LOCK/UNLOCK ROUTINE
58 10 10 50 FO 0045 217 : INSV R0,#16,#16,R8 ;INITIAL STATUS IN HIGH 16 BITS
FFB3' 30 004A 218 : BSBW MMG$INADRINI ;INITIALIZE RETURN ADDRESS ARAYS & SCRATCH A
27 50 E9 004D 219 : BLBC R0,45$
52 54 7D 0050 220 : MOVQ R4,R2 ;R2 = START OF RANGE, R3 = END
FFAA' 30 0053 221 : BSBW MMG$CREDEL ;COMMON CREATE CODE
50 DD 0056 222 : PUSHL R0 ;SAVE STATUS
FFA5' 30 0058 223 : BSBW MMG$RETRANGE ;RETURN AFFECTED ADDRESS RANGE
19 50 E9 005B 224 : BLBC R0,45$ ;USE THIS BAD STATUS RATHER THAN CREDEL
50 BA 005E 225 : POPR R0
11 50 E8 0060 226 : BLBS R0,40$ ;BRANCH IF SUCCESSFUL
50 0194 8F B1 0063 227 : CMPW #SS$_LKWSETFUL,R0 ;IS THIS LOCKED WORKING SET FULL STATUS
0A 12 0068 228 : BNEQ 40$ ;BRANCH IF NOT
OC 10 006A 229 : BSBB 50$ ;REVERIFY SYSTEM DIDN'T SHRINK LIMIT
```



```
50      C8 52      E8 006C 230      BLBS      R2,25$      ;BRANCH IF ADJUSTMENT OCCURED
      0194 8F      3C 006F 231      MOVZWL    #SS$_LKWSETFUL,R0      ;RESET ERROR RETURN STATUS
      0074 232 40$:      ENBINT      ;RESTORE CALLERS IPL
      04 0077 233 45$:      RET
      0078 234
55      00000000'GF      D0 0078 235 50$:      MOVL      G^CTL$GL_PHD,R5      ;GET PROCESS HEADER ADDRESS
      52      D4 007F 236      CLRL      R2      ;ASSUME NO ADJUSTMENT RETURN STATUS
50      18 A5      08 A5      A3 0081 237 55$:      SUBW3    PHD$W_WSLIST(R5),PHD$W_WSLIST(R5),R0 ;GET MAX LOCKABLE SIZE
      50      B6 0087 238      INCW      R0      ;IN ORIGIN 1
      7E      50 50      3C 0089 239      MOVZWL    R0,R0      ;GET IT IN A LONGWORD
      50      8E      C2 008C 240      MOVZWL    PHD$W_WSSIZE(R5),-(SP) ;GET CURRENT SIZE
      50      1B      13 0093 241      SUBL      (SP)+,R0      ;GET DIFFERENCE FROM CURRENT SIZE
      7E      50 A5      B0 0095 242      BEQL      60$      ;BRANCH IF CURRENT SIZE IS QUOTA, R0=0
      7E      50 7E      D4 0099 243      MOVW      PHD$W_WSSIZE(R5),-(SP) ;SAVE STARTING SIZE
      00000000'EF      02      32 009B 244      CLRL      -(SP)      ;NO RETURN SIZE NEEDED
      8E      50 05      FB 009E 245      CVTWL     R0,-(SP)      ;FORM ADJUSTMENT SIZE
      52      01      13 00A9 246      CALLS     #2,SYSS$ADJWSL ;ADJUST THE WORKING SET SIZE
      D1      11      B1 00A5 247      CMPW      PHD$W_WSSIZE(R5),(SP)+ ;DID SIZE CHANGE
      00B1 248      BEQL      60$      ;NO - GIVE UP
      00B1 249      BISB     #1,R2      ;SET ADJUSTMENT PERFORMED
      00B1 250      BRB      55$      ;DO THIS TILL SIZE AT AUTHORIZED QUOTA
      05 00B0 251 60$:      RSB      ;R0 LOW BIT INDICATES CHANGE OCCURRED
      00B1 252
      00B1 253      .DSABL    LSB
```

```
00B1 255 .SBTTL UNLOCK GLOBAL PAGE FROM WORKING SET
00B1 256 :
00B1 257 : CALLING SEQUENCE:
00B1 258 :
00B1 259 : BSBW MMG$ULKGBLWSLE
00B1 260 :
00B1 261 : INPUTS:
00B1 262 :
00B1 263 : IPL = SYNCH
00B1 264 : R1 = WORKING SET LIST INDEX OF ENTRY TO UNLOCK (HIGH 16 BITS = 0)
00B1 265 : R2 = WORKING SET LIST ENTRY (VA AND PAGE TYPE)
00B1 266 : R3 = SYSTEM VIRTUAL ADDRESS OF PAGE TABLE ENTRY
00B1 267 : R4 = PROCESS CONTROL BLOCK ADDRESS
00B1 268 : R5 = PROCESS HEADER ADDRESS (P1 SPACE OK)
00B1 269 :
00B1 270 : OUTPUTS:
00B1 271 :
00B1 272 : R2 PRESERVED
00B1 273 : R8 IS ALTERED
00B1 274 : PHD$W_WSDYN(R5) = NEW WORKING SET LIST INDEX FOR THE UNLOCKED PAGE
00B1 275 :
00B1 276 : *****
00B1 277 :
00B1 278 : ***** THE FOLLOWING CODE MUST BE RESIDENT *****
00B1 279 :
00000000 280 .PSECT $MMGCOD
0000 281 :
0000 282 : *****
0000 283 :
0000 284 MMG$ULKGBLWSLE::
58 00090030 08 DD 0000 285 PUSHL #IPL$ SYNCH ;SAVE IPL FOR ENBINT TO RESTORE
7E 51 7D 0002 286 MOVQ R1,-(SP) ;PUSHL VA, PUSHL WSLX
50 63 DO 0005 287 MOVL (R3),R0 ;GET PAGE TABLE ENTRY
8F DO 0008 288 MOVL #<SS$ WASSET @16 ! - ;SET UNLOCK PARAMETER
000F 289 WSL$M_WSLOCK ! WSL$M_PFNLOCK>,R8 ;IN R8
43 11 000F 290 BRB ULKGBLWSLE ;JOIN COMMON LOCK/UNLOCK CODE
```



```

0011 292 .SBTTL LOCK/UNLOCK SINGLE PAGE IN WORKING SET/MEMORY
0011 293 :++
0011 294 : FUNCTIONAL DESCRIPTION:
0011 295 :
0011 296 :
0011 297 : CALLING SEQUENCE:
0011 298 :
0011 299 : BSBW MMG$LCKULKPAG
0011 300 :
0011 301 : INPUT PARAMETERS:
0011 302 :
0011 303 : R0 = ACCESS MODE TO CHECK AGAINST PAGE OWNER
0011 304 : R2 = VIRTUAL ADDRESS
0011 305 : R4 = PCB ADDRESS
0011 306 : R5 = PROCESS HEADER ADDRESS - P1 OR SYSTEM SPACE
0011 307 : R6 = COUNT - 1 OF PAGES REMAINING TO BE DELETED INCLUDING THIS ONE
0011 308 : R7 = +^X200 IF GOING FORWARD IN ADDRESS SPACE
0011 309 : = -^X200 IF GOING BACKWARDS IN ADDRESS SPACE
0011 310 : R8<0:7> = WSL$M-WSLOCK IF LOCKING IN WORKING SET
0011 311 : = WSL$M-PFNLOCK IF LOCKING IN PHYSICAL MEMORY
0011 312 : = EITHER OR BOTH OF THE ABOVE IF UNLOCKING
0011 313 : R8<8> = LCK_V_LCKPAG SET IF LOCKING, CLEAR IF UNLOCKING
0011 314 : R8<16:31> = SSS_WASSET OR SSS_WASCLR
0011 315 :
0011 316 : IMPLICIT INPUTS:
0011 317 :
0011 318 : NONE
0011 319 :
0011 320 : OUTPUT PARAMETERS:
0011 321 :
0011 322 : R0 = SYSTEM STATUS CODE (INCLUDING 'WAS SET' BIT IF SUCCESSFUL)
0011 323 : R2 = PRESERVED
0011 324 : R8<16:31> = SSS_WASSET IF LOCKING AND THE LOCK HAD ALREADY BEEN SET
0011 325 : = SSS_WASCLR IF UNLOCKING AND THE LOCK HAD ALREADY BEEN CLEAR
0011 326 : - OTHERWISE IT IS PRESERVED.
0011 327 :
0011 328 : IMPLICIT OUTPUTS:
0011 329 :
0011 330 : NONE
0011 331 :
0011 332 : COMPLETION CODES:
0011 333 :
0011 334 : SSS_WASSET ;IF LOCKING, WAS ALREADY LOCKED
0011 335 : SSS_WASCLR ;IF UNLOCKING, WAS ALREADY UNLOCKED
0011 336 : SSS_ACCVIO ;ACCESS VIOLATION
0011 337 : SSS_PAGOWNVIO ;PAGE OWNER VIOLATION
0011 338 : SSS_LKWSETFUL ;IF LOCKING, LOCKED PORTION OF WORK SET FULL
0011 339 :
0011 340 : SIDE EFFECTS:
0011 341 :
0011 342 : NONE
0011 343 :
0011 344 : --

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0011 346 :
0011 347 : *****
0011 348 :
0011 349 : ***** THE FOLLOWING CODE MUST BE RESIDENT *****
0011 350 :
0000 0011 351 : .PSECT $MMGCODE
0011 352 :
0011 353 : *****
0011 354 :
0011 355 : .ENABL LSB
0011 356 :
0011 357 MMG$LOCKKULKPAG::
0011 358 CLRL R1 ;NO WORKING SET LIST INDEX INPUT
0013 359 BBSC #LCK_V GLOBAL,R8,15$ ;ASSUME NOT A GLOBAL PAGE
15$ 0017 360 PROBER #0,#T,(R2) ;IS THIS PAGE ACCESSIBLE?
0018 361 BNEQ 30$ ;BRANCH IF YES
001D 362 MOVZWL #SS$_ACCVIO,R0 ;ACCESS VIOLATION IF NOT
0020 363 RSB
0021 364 30$: TSTB (R2) ;FAULT THE PAGE INTO THE WORKING SET
0023 365 :
0023 366 R0 = ACCESS MODE FOR PAGE OWNER CHECK
0023 367 R1 = 0 INDICATING NO INPUT WORKING SET LIST INDEX
0023 368 R2 = VIRTUAL ADDRESS
0023 369 :
0023 370 DSBINT #IPL$_SYNCH ;RAISE TO SYNCH TO INTERLOCK PFN DATA
0029 371 :
0029 372 PUSHF #^M<R0,R1,R2> ;PUSHING CALLERS IPL
002B 373 BSBW MMG$SVAPTECHK ;PUSH VA, LOCK/UNLOCK FLAG, ACCESS MODE
002E 374 MOVL (R3),R0 ;RETURN R3 = SYS VA OF PAGE TABLE ENTRY
0031 375 BLSS 50$ ;R0 = PAGE TABLE ENTRY
0033 376 : ;BRANCH IF IT'S VALID
0033 377 : PAGE NOT VALID!! MUST HAVE SWAPPED JUST AFTER TOUCHING IT, TRY AGAIN
0033 378 :
0033 379 35$: POPR #^M<R0,R1,R2>
0035 380 ENBINT ;SO WE CAN FAULT IT AGAIN
0038 381 BRB 30$ ;TOUCH THE PAGE AGAIN
003A 382 :
003A 383 40$: MOVZWL #SS$_PAGOWNVIO,R0 ;PAGE OWNER VIOLATION
003F 384 BRB 44$
0041 385 42$: MOVZWL #SS$_NOPRIV,R0 ;NO PRIVILEGE
0044 386 44$: BRW 110$
0047 387 :
0047 388 : THIS PAGE IS NOW VALID AND IN THE WORKING SET
0047 389 :
0047 390 :
0047 391 47$: MOVZWL #SS$_WASSET,R0 ;SUCCESSFUL RETURN PATH FOR SHARED
004A 392 BRW 110$ ;MEMORY AND PFN MAPPED PAGES
004D 393 :
004D 394 50$: CMPZV #PTESV_OWN,#PTESV_OWN,R0,(SP)+ ;CHECK PAGE OWNERSHIP
0052 395 BLSS 40$ ;BRANCH IF OWNER VIOLATION
0054 396 ULKGBLWSLE:
0054 397 BBS #PTESV_WINDOW,R0,47$ ;RETURN SUCCESS FOR PFN MAPPED PAGES
0058 398 EXTZV #PTESV_PFN,#PTESV_PFN,R0 ;RO:RO = PAGE FRAME NUMBER
005D 399 CMPL R0,MMG$GL_MAXPFN ;CHECK FOR PAGE IN SHARED MEMORY
0064 400 BGTRU 47$ ;RETURN SUCCESS FOR SUCH PAGES
0066 401 SUBL PHD$LOBR(R5),R3 ;BYTE OFFSET OF PAGE TABLE ENTRY
006B 402 ASHL #-9,R3,R2 ;BYTE INDEX OF CONTAINING PAGE TABLE
```



```
0070 403
0070 404 ASSUME PFNSC_PROCESS EQ 0
0070 405 ASSUME PFNSC_SYSTEM EQ 1
0070 406 ASSUME PFNSC_GLOBAL EQ 2
0070 407 ASSUME PFNSC_GBLWRT EQ 3
0070 408 ASSUME PFNSC_PPGTBL EQ 4
0070 409 ASSUME PFNSC_GPGTBL EQ 5
0070 410
51 03 00 EE 0070 411 EXTV #PFNSV PAGTYP,#PFNSS PAGTYP,- :SEE IF PAGE IS A TYPE
0000'DF40 0073 412 @W^PFNSAB_TYPE[R0],RT :THAT CAN BE LOCKED
5E 13 0078 413 BEQL 56$ :PROCESS PAGES MAY BE LOCKED
00 58 09 E2 007A 414 BBSS #LCK V GLOBAL,R8,52$ :PAGE IS GLOBAL (OR ERROR)
02 51 D1 007E 415 52$: CMPL R1,#PFNSC_GLOBAL :SEE IF PAGE IS GLOBAL OR GLOBAL WRITE
0A 13 0081 416 BEQL 54$ :BRANCH IF GLOBAL READ ONLY
BC 19 0083 417 BLSS 42$ :BRANCH IF PAGE TYPE NOT LOCKABLE
0085 418 :
0085 419 : PAGE IS GLOBAL WRITE, MAY BE LOCKED IN MEMORY, BUT NOT IN WORKING SET BECAUSE
0085 420 : THE SWAPPER DROPS GLOBAL WRITABLE PAGES FROM THE WORKING SET ON OUTSWAP
0085 421 :
04 58 08 E1 0085 422 BBC #LCK V_LCKPAG,R8,54$ :OK IF UNLOCKING
B4 58 05 E0 0089 423 BBS #WSL$V-WSLOCK,R8,42$ :CANNOT LOCK GLOBAL WRITE IN WORKING SET
51 6E 3C 008D 424 54$: MOVZWL (SP),RT :NORMALLY 0, WSLX IF ULKGBLWSLE
4C 12 0090 425 BNEQ 57$ :BRANCH IF IT IS A WSLX
0092 426 :
0092 427 : NEED TO SCAN FOR THE WORKING SET LIST INDEX SINCE THE WSLX ARRAY
0092 428 : DOES NOT CONTAIN THE BACKPOINTER FOR GLOBAL PAGES
0092 429 :
52 52 DD 0092 430 PUSHL R2 :SAVE INDEX OF PAGE TABLE CONTAINING THIS PA
08 AE D0 0094 431 MOVL 8(SP),R2 :RECOVER VIRTUAL ADDRESS
0157 30 0098 432 BSBW MMG$SCNWSLX :SCAN FOR WORKING SET LIST INDEX
0098 433 :
0098 434 : MAY HAVE BEEN SWAPPED, RECALCULATE PTE ADR, REFETCH PFN
0098 435 :
50 15 00 EF 009B 436 EXTZV #PTESV_PFN,#PTESS PFN,- :REFETCH PFN GIVEN THE
00C8 D543 009E 437 @PHD$1_POBR(R5)[R3],R0 :BYTE OFFSET OF PTE IN PAGE TABLE
04 BA 00A3 438 POPR #M<R2$ :RECOVER SAVE R2
51 D5 00A5 439 TSTL R1 :FOUND THE WORKING SET LIST INDEX?
35 12 00A7 440 BNEQ 57$ :BRANCH IF YES
00A9 441 :
00A9 442 : CHECK FOR A RESIDENT GLOBAL SECTION PAGE
00A9 443 :
51 0000'DF40 D0 00A9 444 MOVL @W^PFNSAL BAK[R0],R1 :GET BACKING STORE
1F 51 16 E1 00AF 445 BBC #PTESV_TYPO,R1,55$ :MUST BE PAGE-FILE
51 51 32 00B3 446 CVTWL R1,R1 :ISOLATE GLOBAL SECTION TABLE INDEX
50 00000000'FF DE 00B6 447 MOVAL @L^MMG$GL SYSPHD,R0 :ADDRESS OF SYSTEM HEADER
50 20 A0 C0 00BD 448 ADDL PHD$1 PSTBASOFF(R0),R0 :GET SECTION TABLE BASE
50 6041 DE 00C1 449 MOVAL (R0)[R1],R0 :GET THE CORRECT SECTION TABLE ENTRY
03 0000'C0 00000000'BF E1 00C5 450 BBC #SEC$V_RESIDENT,SEC$W_FLAGS(R0),55$ :RETURN SUCCESS
FF75 31 00CF 451 BRW 47$
00D2 452 :
00D2 453 : THE GLOBAL PAGE WAS REMOVED FROM THE WORKING SET. THE ROUTINE WILL BE
00D2 454 : BACKED OUT AFTER THE STACK IS PUT INTO A CONSISTENT STATE.
00D2 455 :
FC AD DD 00D2 456 55$: PUSHL MMG$L_MAXACMODE(FP) :PUSH ACCESS MODE FOR OWNER CHECK
FF5B 31 00D5 457 BRW 35$ :JOIN COMMON RETRY LOGIC
00D8 458 :
00D8 459 : PROCESS PAGE, GET WORKING SET LIST INDEX FROM PFN DATA BASE
```

```
00D8 460 :  
00D8 461 56$: PFN REFERENCE -  
00D8 462 MOVZWL <@W^PFNSAx WSLX[R0],R1>,- ;R1 = INDEX TO WORKING SET LIST ENTR  
00D8 463 LONG OPCODE=MOVL,-  
00D8 464 IMAGE=SYS_NONPAGED  
53 6541 DE 00DE 465 57$: MOVAL (R5)[R1],R3 ;R3 = ADDRESS OF ENTRY  
00E2 466 :  
00E2 467 : R0 = PAGE FRAME NUMBER  
00E2 468 : R1 = WORKING SET LIST INDEX FOR THIS PAGE  
00E2 469 : R2 = INDEX OF PAGE TABLE CONTAINING THIS PAGE  
00E2 470 : R3 = WORKING SET LIST ENTRY ADDRESS  
00E2 471 : 0(SP) = SCRATCH  
00E2 472 : 4(SP) = SAVED VIRTUAL ADDRESS  
00E2 473 :  
5B 58 08 E1 00E2 474 58$: BBC #LCK_V_LCKPAG,R8,80$ ;BRANCH IF UNLOCKING  
00E6 475 :  
00E6 476 : LOCK THE PAGE IN THE WORKING SET LIST  
00E6 477 :  
63 58 93 00E6 478 BITB R8,(R3) ;ALREADY LOCKED?  
07 13 00E9 479 BEQL 60$ ;BRANCH IF NOT  
58 10 10 09 F0 00EB 480 INSV #SS$_WASSET,#16,#16,R8 ;PREVIOUS STATE OF LOCK WAS SET  
78 11 00F0 481 BRB 96$ ;NOTE INSV CLEARS Z BIT  
CF 8F 8B 00F2 482 60$: BICB3 #^C<WSL$M_WSLOCK ! WSL$M_PFNLOCK>,- ;SAVE THE CURRENT STATE  
6E 63 00F5 483 (R3),(SP) ;OF THE LOCK BITS  
0E 12 00F7 484 BNEQ 62$ ;BRANCH IF NEITHER IS SET  
76 A5 01 B1 00F9 485 CMPW #1,PHD$W_EXTDYNWS(R5) ;POSSIBLE TO LOCK 2 MORE PAGES?  
08 1F 00FD 486 BLSSU 62$ ;BRANCH IF YES  
50 0194 8F 3C 00FF 487 MOVZWL #SS$_LKWSETFUL,R0 ;LOCKED PORTION OF WORKING SET FULL  
0084 31 0104 488 BRW 110$  
15 58 04 E1 0107 489 62$: BBC #WSL$V_PFNLOCK,R8,68$ ;BRANCH IF LOCKING IN WORKING SET  
0B 58 09 E1 010B 490 BBC #LCK_V_GLOBAL,R8,64$ ;BRANCH IF PAGE IS NOT GLOBAL  
010F 491 PFN REFERENCE -  
010F 492 ACBW <#1,#1,@W^PFNSAx WSLX[R0],64$ >,- ;BRANCH IF FIRST LOCK IN  
010F 493 LONG OPCODE=ACBL,-  
010F 494 IMAGE=SYS_NONPAGED  
0118 495 :  
0118 496 : MEMORY OF THIS GLOBAL PAGE  
0000 06 11 0118 497 64$: BRB 68$  
71 19 011E 498 DECL W^MMG$GL_PFNLOCK ;CAN ANY MORE PAGES BE LOCKED IN MEMORY?  
63 58 88 0120 499 68$: BLSS 150$ ;BRANCH IF NO, TOO MANY ALREADY LOCKED  
6E 95 0123 500 BISB R8,(R3) ;SET NEW LOCK BIT IN WSLE  
5F 12 0125 501 TSTB (SP) ;WAS ENTRY ALREADY IN LOCKED PART OF WS?  
0127 502 BNEQ 100$ ;BRANCH IF YES  
0127 503 :  
0127 504 : ENTRY MUST BE PLACED IN THE LOCKED PORTION OF THE WORKING SET  
0127 505 :  
7C 10 0127 505 BSBB SWAPLOCK ;SWAP THE WORKING SET LIST ENTRIES  
62 96 0129 506 INCB (R2) ;COUNT ANOTHER LOCKED WSLE FOR THIS PAGE TAB  
03 14 012B 507 BGTR 70$ ;BRANCH IF NOT THE FIRST IN THIS PT  
6C A5 B6 012D 508 INCW PHD$W_PTCNTLCK(R5) ;ANOTHER PAGE TABLE WITH LOCKED WSLE'S  
0E A5 B6 0130 509 70$: INCW PHD$W_WSDYN(R5) ;DYNAMIC PART OF LIST  
0E A5 10 A5 B1 0133 510 : ;STARTS ONE ENTRY HIGHER  
0138 511 CMPW PHD$W_WSNEXT(R5),PHD$W_WSDYN(R5) ;IS WSNEXT NO LONGER  
0138 512 : ;POINTING INTO DYNAMIC REGION?  
49 1E 0138 513 BGEQU 98$ ;BRANCH IF IT'S OK  
10 A5 12 A5 B0 013A 514 MOVW PHD$W_WSLAST(R5),PHD$W_WSNEXT(R5) ;OTHERWISE POINT IT TO END  
42 11 013F 515 BRB 98$ ;EXIT SUCCESSFULLY  
0141 516 :
```



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0141 517 : UNLOCK PAGE FROM WORKING SET LIST
0141 518 :
63 58 93 0141 519 80$: BITB R8,(R3) ;IS THIS PAGE LOCKED?
07 12 0144 520 BNEQ 90$ ;BRANCH IF YES
58 10 10 01 10 F0 0146 521 INSV #SS$_WASCLR,#16,#16,R8 ;AT LEAST ONE PAGE WAS ALREADY UNLOCKED
13 63 39 11 0148 522 BRB 100$
OF 58 04 E1 014D 523 90$: BBC #WSL$V-PFNLOCK,(R3),94$ ;BRANCH IF PAGE NOT LOCKED IN MEMORY
07 58 04 E1 0151 524 BBC #WSL$V-PFNLOCK,R8,94$ ;BRANCH IF NOT UNLOCKING IT FROM MEMORY
07 58 09 E1 0155 525 BBC #LCK V-GLOBAL,R8,92$ ;BRANCH IF NOT A GLOBAL PAGE
0159 526 PFN REFERENCE -
0159 527 DECW <@W*PFNS$X,WSLX[R0]>,- ;ONE LESS MEMORY LOCK FOR THIS GLOBA
0159 528 LONG OPCODE=DECL,-
0159 529 IMAGE=SYS_NONPAGED
0000'CF 04 14 015E 530 BGTR 94$ ;BRANCH IF NOT LAST MEMORY LOCK
63 58 8A 0160 531 92$: INCL W*MMG$GL_PFNLOCK ;ANOTHER PAGE MAY BE LOCKED IN MEMORY
63 30 93 0164 532 94$: BICB R8,(R3) ;CLEAR THE DESIRED LOCK BIT(S)
016A 533 BITB #<WSL$M_WSLOCK ! WSL$M_PFNLOCK>,(R3) ;MUST PAGE REMAIN IN THE
016A 534 ;LOCKED PORTION OF THE WORKING SET?
1A 12 016A 535 96$: BNEQ 100$ ;BRANCH IF YES, IT IS STILL LOCKED
016C 536 :
016C 537 : MOVE THIS WORKING SET LIST ENTRY OUT OF THE LOCKED PORTION OF THE WORKING ET
016C 538 :
OE A5 B7 016C 539 DECW PHD$W WSDYN(R5) ;INCLUDE LAST LOCKED SLOT IN DYNAMIC REGION
34 10 016F 540 BSBW SWAPLOCK ;SWAP ENTRIES WITH THE LAST LOCKED ONE
52 DD 0171 541 PUSHL R2 ;SAVE BYTE INDEX OF PAGE TABLE PAGE
52 08 AE D0 0173 542 MOVL 8(SP),R2 ;RESTORE VA
FE86' 30 0177 543 BSBW MMG$SVAPTECHK ;GET R3 = SVAPTE
52 8ED0 017A 544 POPL R2 ;RESTORE BYTE INDEX OF PAGE TABLE PAGE
50 01 CE 017D 545 MNEGL #1,R0 ;INDICATOR DECREMENT OF PTWSLELCK ARRAY
FE7D' 30 0180 546 BSBW MMG$MOVPTLOCK1 ;ONE LESS REASON PT PAGE MUST BE LOCKED
FE7A' 30 0183 547 98$: BSBW MMG$EXTRADYNWS ;RECALCULATE EXTRA DYNAMIC WSLE COUNT
50 58 FO 8F 78 0186 548 100$: ASHL #-16,R8,R0 ;RETURN WASSET OR WASCLR
06 BA 0188 549 110$: POPR #*M<R1,R2> ;RESTORE R2 = VIRTUAL ADDRESS
018D 550 ENBINT ;AND RESTORE THE CALLING IPL
05 0190 551 RSB ;AND RETURN
0191 552 :
0191 553 : TOO MANY PAGES LOCKED IN MEMORY TO ALLOW ANOTHER TO BE LOCKED
0191 554 :
05 58 09 E1 0191 555 150$: BBC #LCK V GLOBAL,R8,155$ ;BRANCH IF PAGE NOT GLOBAL
0195 556 PFN REFERENCE -
0195 557 DECW <@W*PFNS$X,WSLX[R0]>,- ;THIS GLOBAL PAGE NOT LOCKED IN MEMO
0195 558 LONG OPCODE=DECL,-
0195 559 IMAGE=SYS_NONPAGED
0000'CF 04 14 019A 561 155$: INCL W*MMG$GL_PFNLOCK ;FIX THE COUNTER
50 00D4 8F 3C 019E 562 MOVZWL #SS$_LCKPAGFUL,R0 ;NO MORE PAGES MAY BE LOCKED IN MEMORY
E6 11 01A3 563 BRB 110$
01A5 564
01A5 565 .DSABL LSB
```

```
01A5 567 .SBTTL SWAPLOCK - INTERFACE TO SWAPWSLE FROM LOCK/UNLOCK
01A5 568
01A5 569 :
01A5 570 : INPUTS:
01A5 571 :
01A5 572 : R0 = PFN OF THE FIRST WORKING SET LIST SLOT
01A5 573 : R1 = INDEX TO FIRST WORKING SET LIST SLOT (WSLX1)
01A5 574 : R2 = BYTE INDEX OF PAGE TABLE CONTAINING THE PAGE BEING LOCKED/UNLOCKED
01A5 575 : R4 = PCB ADDRESS
01A5 576 : R5 = PROCESS HEADER ADDRESS - P1 OR SYSTEM SPACE
01A5 577 : IPL = SYNCH, ESSENTIAL FOR MANIPULATING WORKING SET LIST
01A5 578 : FOR SYSTEM SPACE, AND BECAUSE PFN DATA BASE IS CHANGED
01A5 579 :
01A5 580 : OUTPUTS:
01A5 581 :
01A5 582 : R0 PRESERVED
01A5 583 : R2 = ADDRESS OF BYTE CONTAINING COUNT OF LOCKED WORKING SET LIST
01A5 584 : ENTRIES IN THE PAGE TABLE
01A5 585 : SPECIFIED WORKING SET LIST ENTRIES ARE SWAPPED
01A5 586 :
01A5 587 SWAPLOCK:
52 52 DD 01A5 588 PUSHL R2 ;SAVE PAGE TABLE NUMBER
52 0E A5 3C 01A7 589 MOVZWL PHD$W_WSDYN(R5),R2 ;INDEX TO SECOND WORKING SET LIST SLOT (WSLX)
52 55 64 A5 C1 01AB 590 BSBB MMG$SWAPWSLE ;SWAP THE WORKING SET LIST ENTRIES
52 8E C0 01AD 591 ADDL3 PHD$L_PTWSLELCK(R5),R5,R2 ;BASE ADDRESS OF ARRAY OF COUNTS OF
52 8E C0 01B2 592 ADDL (SP)+,R2 ;LOCKED WORKING SET LIST ENTRIES
01B5 593 ;ADDRESS OF COUNT BYTE FOR # OF LOCKED
01B5 594 ;WSLE'S IN THE PAGE TABLE
05 01B5 595 RSB
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01B6 597 .SBTTL SWAPWSLE - SWAP WORKING SET LIST ENTRIES
01B6 598 :++
01B6 599 : FUNCTIONAL DESCRIPTION:
01B6 600 :
01B6 601 :     THIS ROUTINE SWAPS THE CONTENTS OF THE FIRST WORKING SET LIST SLOT
01B6 602 :     WHICH MUST BE ACTIVE WITH THAT OF THE SECOND WORKING SET LIST SLOT
01B6 603 :     WHICH MAY BE EITHER ACTIVE OR FREE.
01B6 604 :
01B6 605 : CALLING SEQUENCE:
01B6 606 :
01B6 607 :     BSBW    MMG$SWAPWSLE
01B6 608 :
01B6 609 : INPUT PARAMETERS:
01B6 610 :
01B6 611 :     R0 = PFN OF THE FIRST WORKING SET LIST SLOT
01B6 612 :     R1 = INDEX TO FIRST WORKING SET LIST SLOT (WSLX1)
01B6 613 :     R2 = INDEX TO SECOND WORKING SET LIST SLOT (WSLX2)
01B6 614 :     R4 = PCB ADDRESS
01B6 615 :     R5 = PROCESS HEADER ADDRESS - P1 OR SYSTEM SPACE
01B6 616 :     IPL = SYNCH, ESSENTIAL FOR MANIPULATING WORKING SET LIST
01B6 617 :           FOR SYSTEM SPACE, AND BECAUSE PFN DATA BASE IS CHANGED
01B6 618 :
01B6 619 : IMPLICIT INPUTS:
01B6 620 :
01B6 621 :     NONE
01B6 622 :
01B6 623 : OUTPUT PARAMETERS:
01B6 624 :
01B6 625 :     R0 PRESERVED
01B6 626 :
01B6 627 : IMPLICIT OUTPUTS:
01B6 628 :
01B6 629 :     NONE
01B6 630 :
01B6 631 : COMPLETION CODES:
01B6 632 :
01B6 633 :     NONE
01B6 634 :
01B6 635 : SIDE EFFECTS:
01B6 636 :
01B6 637 :     NONE
01B6 638 :
01B6 639 :--

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01B6 641 :
01B6 642 : *****
01B6 643 :
01B6 644 : ***** THE FOLLOWING CODE MUST BE RESIDENT *****
01B6 645 :
000001B6 646 : .PSECT $MMGCODE
01B6 647 :
01B6 648 : *****
01B6 649 :
01B6 650 : .ENABL LSB
01B6 651 :
01B6 652 MMG$SWAPWSLE::
52 51 D1 01B6 653 CMPL R1,R2 ;IS THE SWAP A NOP?
32 13 01B9 654 BEQL 90$ ;BRANCH IF YES
6541 DD 01BB 655 PUSHL (R5)[R1] ;PUSH WSLE1
05 BB 01BE 656 PUSHR #^M<R0,R2> ;PUSH WSLX2, PFN(WSLX1)
52 6542 D0 01C0 657 MOVL (R5)[R2],R2 ;GET WSLE2
05 12 01C4 658 BNEQ 50$ ;BRANCH IF NOT AN EMPTY ENTRY
6541 D4 01C6 659 CLRL (R5)[R1] ;JUST FREE WSLX1
0F 11 01C9 660 BRB 70$ ;AND GO SET UP WSLX2
20 52 E9 01CB 661 50$: BLBC R2,SWAPWSLEBUG ;BRANCH IF WSLE NOT VALID, ERROR
51 DD 01CE 662 PUSHL R1 ;SAVE WSLX1
FE2D' 30 01D0 663 BSBW MMG$SVAPTECHK ;RETURN R3 = SYS VA OF PAGE TABLE ENTRY
FE2A' 30 01D3 664 BSBW MMG$WSLEPFN ;GET PFN FROM SVAPTE OF THIS WSLE
02 BA 01D6 665 POPR #^M<R1> ;R1 = WSLX1
02 10 01D8 666 BSBW SETWSLE ;STORE WSLE AND WSLX
01DA 667 :
01DA 668 : MOVE THE OLD WSLE1 INTO SLOT INDEXED BY WSLX2
01DA 669 : 0(SP) = PFN OF WSLE1, 4(SP) = WSLX2, 8(SP) = WSLE1
01DA 670 :
07 BA 01DA 671 70$: POPR #^M<R0,R1,R2> ;R0=PFN, R1=WSLX2, R2=WSLE1
01DC 672 :
01DC 673 : STORE WORKING SET LIST ENTRY INTO ITS WORKING SET LIST ENTRY SLOT
01DC 674 : AND STORE WSLX INTO PFN DATA BASE IF PAGE TYPE IS NOT GLOBAL
01DC 675 : R0 = PAGE FRAME NUMBER
01DC 676 : R1 = WSLX, R2 = WORKING SET LIST ENTRY WITH PAGE TYPE
01DC 677 :
01DC 678 SETWSLE:
02 52 6541 52 D0 01DC 679 MOVL R2,(R5)[R1] ;STORE WORKING SET LIST ENTRY
03 01 EC 01E0 680 CMPV #WSL$V_PAGTYP,#WSL$S_PAGTYP,R2,#PFN$C_GLOBAL ;GLOBAL PAGE?
06 18 01E5 681 BGEQ 90$ ;BRANCH IF NOT
01E7 682 PFN_REFERENCE -
01E7 683 MOVW <R1,@W^PFN$X WSLX[R0]>,- ;SET PFN WSLX
01E7 684 LONG_OPCODE=MOVL,-
01E7 685 IMAGE=SYS_NONPAGED
05 01ED 686 90$: RSB ;AND RETURN
01EE 687 :
01EE 688 : LENGTH VIOLATION FOR VIRTUAL ADDRESS IN WORKING SET LIST
01EE 689 :
01EE 690 SWAPWSLEBUG:
01EE 691 BUG_CHECK SWAPWSLE,FATAL
01F2 692 :
01F2 693 .DSABL LSB
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01F2 695 .SBTTL SCNWSLX - SCAN FOR WORKING SET LIST INDEX
01F2 696 :++
01F2 697 :
01F2 698 : FUNCTIONAL DESCRIPTION:
01F2 699 :
01F2 700 : THIS ROUTINE SCANS THE ENTIRE WORKING SET FOR THE SPECIFIED
01F2 701 : VIRTUAL ADDRESS. IT IS CALLED AT IPL=SYNCH, LOWERS TO IPL=ASTDEL
01F2 702 : TO DO THE SCAN AND RAISES BACK TO SYNCH WHEN COMPLETED.
01F2 703 : DROPPING IPL TO ASTDEL AND THUS MAKING THE PROCESS ELIGIBLE
01F2 704 : FOR SWAPPING, PLACES THE FOLLOWING RESTRICTIONS ON THIS CODE AND
01F2 705 : ITS CALLERS.
01F2 706 :
01F2 707 : 1) THIS CODE MAY NOT FAULT PROCESS PAGES SINCE THAT MIGHT
01F2 708 : FAULT OUT THE DESIRED WORKING SET LIST ENTRY.
01F2 709 : 2) THE CALLING CODE MAY NOT KEEP ANY SYSTEM SPACE ADDRESSES
01F2 710 : FOR THE PROCESS HEADER OR PAGE TABLE ENTRIES SINCE THE HEADER BASE
01F2 711 : ADDRESS MAY CHANGE IF THE PROCESS IS SWAPPED.
01F2 712 : 3) THE CALLING CODE MAY NOT HOLD A PFN FOR A GIVEN PAGE SINCE
01F2 713 : THAT TOO COULD CHANGE IF THE PROCESS WERE SWAPPED.
01F2 714 :
01F2 715 : CALLING SEQUENCE:
01F2 716 :
01F2 717 : BSBW MMG$SCNWSLX
01F2 718 :
01F2 719 : INPUTS:
01F2 720 :
01F2 721 : R2 = VIRTUAL ADDRESS TO SCAN FOR
01F2 722 : R5 = P1 ADDRESS OF PROCESS HEADER
01F2 723 : IPL = SYNCH, DROPS TO ASTDEL, RESTORES TO SYNCH ON RETURN
01F2 724 : SEE FUNCTIONAL DESCRIPTION ABOVE!
01F2 725 :
01F2 726 : OUTPUTS:
01F2 727 :
01F2 728 : R1 = WORKING SET LIST INDEX IF FOUND
01F2 729 : = 0 IF NOT FOUND
01F2 730 : R3 = PRESERVED
01F2 731 : IPL = IS LOWERED TO ASTDEL AND RESTORED TO SYNCH ON RETURN
01F2 732 : SEE FUNCTIONAL DESCRIPTION ABOVE!
01F2 733 :--

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01F2 735 :
01F2 736 : *****
01F2 737 :
01F2 738 : ***** THE FOLLOWING CODE MUST BE RESIDENT *****
01F2 739 :
0000 01F2 740 : .PSECT $MMGCODE
01F2 741 :
01F2 742 : *****
01F2 743 :
01F2 744 : MMG$SCNWSLX::
01F2 745 : SETIPL #IPL$ ASTDEL ;LOWER IPL FROM SYNCH TO ASTDEL
52 52 F7 8F 78 01F5 746 : ASHL #-VASS BYTE,R2,R2 ;JUST INTERESTED IN PAGE NUMBER BITS
51 51 0C A5 3C 01FA 747 : MOVZWL PHD$W WSLCK(R5),R1 ;INDEX TO FIRST NON-PERMANENT WSLE
51 51 65 41 DE 01FE 748 : MOVAL (R5)[R1],R1 ;ADDRESS OF FIRST WSLE
50 50 12 A5 3C 0202 749 : MOVZWL PHD$W WSLAST(R5),R0 ;INDEX TO LAST (INCLUSIVE) WSLE
50 50 65 40 DE 0206 750 : MOVAL (R5)[R0],R0 ;ADDRESS OF LAST WSLE
52 61 17 09 EC 020A 751 20$: CMPV #VASS_VPG,#VASS_VPG,(R1),R2 ;IS THIS THE DESIRED WSLE?
51 51 0C 0C 13 020F 752 : BEQL 40$ ;BRANCH IF YES
FFF3 51 04 50 F1 0211 753 : ACBL R0,#4,R1,20$ ;LOOP THROUGH ALL THE SLOTS
0217 754 :
0217 755 : WORKING SET LIST ENTRY NOT FOUND FOR SPECIFIED VIRTUAL ADDRESS
0217 756 :
51 D4 0217 757 30$: CLRL R1 ;RETURN IMPOSSIBLE WSLX
0219 758 : SETIPL #IPL$_SYNCH ;RESTORE IPL SYNCH
05 021C 759 : RSB ;AND RETURN TO CALLER
021D 760 :
021D 761 : FOUND THE WORKING SET LIST ENTRY
021D 762 :
021D 763 40$: SETIPL #IPL$_SYNCH ;BACK TO IPL SYNCH
F4 61 E9 0220 764 : BLBC (R1),30$ ;MAKE SURE SWAPPER DIDN'T JUST
51 51 55 C2 0223 765 : ;RIP THE ENTRY OUT FROM UNDER US
51 51 1E 9C 0223 766 : SUBL R5,R1 ;CONVERT ADDRESS
05 0226 767 : ROTL #<32-2>,R1,R1 ;BACK TO INDEX
05 022A 768 : RSB ;RETURN WITH WSLX IN R1
```



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022B 770 .SBTTL MMG$EXPKSTACK - EXPAND THE KERNEL STACK
022B 771 :++
022B 772 :
022B 773 : FUNCTIONAL DESCRIPTION:
022B 774 :
022B 775 : THIS ROUTINE EXPANDS THE KERNEL STACK BY ALLOCATING PHYSICAL MEMORY AND
022B 776 : USING THE RESERVED WORKING SET LIST ENTRIES. THIS ROUTINE RETURNS WITH
022B 777 : SUCCESS IF THE STACK HAS ALREADY BEEN EXPANDED.
022B 778 :
022B 779 : CALLING SEQUENCE:
022B 780 :
022B 781 : CALLS #0,MMG$EXPKSTK
022B 782 :
022B 783 : INPUTS:
022B 784 :
022B 785 : NONE
022B 786 :
022B 787 : OUTPUTS:
022B 788 :
022B 789 : NONE
022B 790 :--

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022B 792 :
022B 793 : *****
022B 794 :
022B 795 : ***** THE FOLLOWING CODE MUST BE RESIDENT *****
022B 796 :
0000022B 797 : .PSECT $MMGCODE
022B 798 :
022B 799 : *****
022B 800 :
022B 801 : MMG$EXPKSTK::
007C 022B 802 : .WORD ^M<R2,R3,R4,R5,R6>
022D 803 : DSBINT #IPL$ ASTDEL ;DON'T LET THINGS GET CONFUSED
54 0000'CF D0 0233 804 : MOVL W^SCH$GL CURPCB,R4 ;R4 = PCB
55 00000000'EF D0 0238 805 : MOVL CTLSGL_PHD,R5 ;R5 = P1 PHD
FFFFFFF'8F D0 023F 806 : MOVL #SWPSC_KSTACK_EX_WSL- ;WSL INDEX FOR FIRST EXPANSION PAGE
56 0245 807 : +SWPSC_KSTACK_EX-1,R6
6546 D5 0246 808 : TSTL (R5)[R6] ;HAVE WE ALREADY EXPANDED
7B 12 0249 809 : BNEQ 30$ ;YES
52 00000000'8F D0 024B 810 : MOVL #CTLSGL_KSTKBASEXP,R2 ;VA OF FIRST EXPANSION PAGE
0252 811 10$: SETIPL #IPL$ SYNCH
7E FDA8' 30 0255 812 : BSBW MMG$SVAPTECHK ;GET SVAPTE IN R3
52 7E FDA2' 7D 0258 813 : MOVQ R2,-(SP)
6E 7D 025B 814 : BSBW MMG$FREWSLE ;MAKE SURE WE CAN ADD A WSL PAGE
69 50 E9 025E 815 : MOVQ (SP),R2
7E 10 A5 B0 0261 816 : BLBC R0,100$
10 A5 56 B0 0264 817 : MOVW PHD$W_WSNEXT(R5),-(SP) ;SAVE THE FREE POINTER
10 A5 FD91' 30 0268 818 : MOVW R6,PHD$W_WSNEXT(R5) ;USE THIS WSL ENTRY
10 A5 8E B0 026C 819 : BSBW MMG$ININEWPFN ;GET A PFN AND FILL IN WSL
52 8E 7D 026F 820 : MOVW (SP)+,PHD$W_WSNEXT(R5) ;RESTORE THE FREE POINTER
50 D5 0273 821 : MOVQ (SP)+,R2
5E 19 0276 822 : TSTL R0
00000000'FF40 07 88 0278 823 : BLSS 110$ ;NO PFN AVAILABLE
D0000000 8F C9 027A 824 : BISB #PFN$C_ACTIVE,@L^PFN$AB_STATE[R0] ;MARK IT ACTIVE
63 50 0282 825 : BISL3 #<PTESM_VALID ! PTESM_SRKW>,-
0288 826 : R0,(R3) ;A VALID PTE
6546 20 C8 028A 827 : INVALID R2
08 A5 B7 028D 828 : BISL #WSL$M_WSLOCK,(R5)[R6] ;SET LOCK BIT
52 0200 C2 9E 0291 829 : DECW PHD$W_WSLIST(R5) ;WSL STARTS ONE PAGE SOONER
0294 830 : MOVAB 512(R2),R2 ;NEXT PAGE
0299 831 : SETIPL #IPL$ ASTDEL ;LET THE SYSTEM DO SOMETHING ELSE
FFAE 56 FF 8F 00'8F 9D 029C 832 : ACBB #SWPSC_KSTACK_EX_WSL,#-1,R6,10$ ;NEXT WSL FOR EXPANSION
FFFFFFFC'EF 00000000'8F D0 02A4 833 : MOVL #CTLSGL_KSTKBASEXP,CTLSAL_STACK-4 ;NEW STACK LIMITS
00000000'EF 00000000'8F D0 02AF 834 : MOVL #CTLSGL_KSTKBASEXP,CTLSAL_STACKLIM
0000'8F 00 6E 00 2C 02BA 835 : MOVCS #0,(SP),#0,#^X200*SWPSC_KSTACK_EX,-
02C1 836 : CTLSGL_KSTKBASEXP ;ZERO THE NEW PAGES
50 01 3C 02C6 837 30$: ENBINT
02C9 838 : MOVZWL #SS$_NORMAL,R0
04 02CC 839 : RET
02CD 840 :
FD30' 30 02CD 841 100$: BSBW MMG$RESRCWAIT ;PUT PROCESS ON CORRECT QUEUE
7E DC 02D0 842 105$: MOVPSL -(SP) ;WAIT AT THIS PSL
FD2B' 30 02D2 843 : BSBW MMG$SVPCITX ;WAIT FOR RESOURCE
FF7A 31 02D5 844 : BRW 10$ ;TRY AGAIN
02D8 845 :
50 0000'CF 7E 02D8 846 110$: MOVAQ W^SCH$GQ_FPGWQ,R0 ;FREE PAGE QUEUE
08 A0 B6 02DD 847 : INCW WQH$W_WQNT(R0) ;ONE MORE WAITER
60 64 0E 02E0 848 : INSQUE (R4),(R0) ;QUEUE THE PCB
```



SYSLKWSET  
V04-000

B 5  
- LOCK/UNLOCK FROM WORKING SET/MEMORY  
MMG\$EXPKSTACK - EXPAND THE KERNEL STACK

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|    |    |    |    |    |      |     |      |  |
|----|----|----|----|----|------|-----|------|--|
| 2C | A4 | 0A | A0 | B0 | 02E3 | 849 | MOVW | WQH\$W_WQSTATE(R0),PCB\$W_STATE(R4) ;SET WAIT STATE IN PCB |
|    |    | E6 |    | 11 | 02E8 | 850 | BRB  | 105\$  |
|    |    |    |    |    | 02EA | 851 |      |  |
|    |    |    |    |    | 02EA | 852 | .END |  |



SYSLKWSET  
Symbol table

- LOCK/UNLOCK FROM WORKING SET/MEMORY

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...PFN = 000001E7 R 04  
ACMODE = 0000000C  
BIT = 0000000A  
BUG\$ SWAPWSLE \*\*\*\*\* X 04  
CTLSAL\_STACK \*\*\*\*\* X 04  
CTLSAL\_STACKLIM \*\*\*\*\* X 04  
CTLSGL\_KSTKBASEXP \*\*\*\*\* X 04  
CTLSGL\_PHD \*\*\*\*\* X 03  
EXESLCKPAG 0000001E RG 03  
EXESLKWSET 00000017 RG 03  
EXESULKPAG 00000007 RG 03  
EXESULWSET 00000000 RG 03  
INADR = 00000004  
IPL\$ ASTDEL = 00000002  
IPL\$ SYNCH = 00000008  
LCK\_M\_GLOBAL = 00000200  
LCK\_M\_LCKPAG = 00000100  
LCK\_V\_GLOBAL = 00000009  
LCK\_V\_LCKPAG = 00000008  
MMG\$CREDEL \*\*\*\*\* X 03  
MMG\$C\_LENGTH = FFFFFFFE4  
MMG\$EXPKSTK 0000022B RG 04  
MMG\$EXTRADYNWS \*\*\*\*\* X 04  
MMG\$FREWSLE \*\*\*\*\* X 04  
MMG\$GL\_MAXPFN \*\*\*\*\* X 04  
MMG\$GL\_PFNLOCK 00000000 RG 02  
MMG\$GL\_SYSPHD \*\*\*\*\* X 04  
MMG\$INADRI \*\*\*\*\* X 03  
MMG\$ININEWPFN \*\*\*\*\* X 04  
MMG\$LCULKPAG 00000011 RG 04  
MMG\$MAXACMODE = FFFFFFFFC  
MMG\$MOVPTLOCK1 \*\*\*\*\* X 04  
MMG\$RESRCWAIT \*\*\*\*\* X 04  
MMG\$RETRANGE \*\*\*\*\* X 03  
MMG\$SCNWSLX 000001F2 RG 04  
MMG\$SVAPTECHK \*\*\*\*\* X 04  
MMG\$SVPCTX \*\*\*\*\* X 04  
MMG\$SWAPWSLE 000001B6 RG 04  
MMG\$ULKGBLWSLE 00000000 RG 04  
MMG\$WSLEPFN \*\*\*\*\* X 04  
OPS ACBL = 000000F1  
OPS ACBW = 0000003D  
OPS DECL = 000000D7  
OPS DECU = 000000B7  
OPS MOVL = 000000D0  
OPS MOVW = 000000B0  
OPS MOVZWL = 0000003C  
PCBSQ PRIV = 00000084  
PCBSW STATE = 0000002C  
PFNSAB STATE \*\*\*\*\* X 04  
PFNSAB TYPE \*\*\*\*\* X 04  
PFNSAL BAK \*\*\*\*\* X 04  
PFNSAX WSLX \*\*\*\*\* X 04  
PFNSC ACTIVE = 00000007  
PFNSC GBLWRT = 00000003  
PFNSC GLOBAL = 00000002  
PFNSC GPGTBL = 00000005

PFNSC\_PPGTBL = 00000004  
PFNSC\_PROCESS = 00000000  
PFNSC\_SYSTEM = 00000001  
PFNSS\_PAGTYP = 00000003  
PFNSV\_PAGTYP = 00000000  
PHDSL\_POBR = 000000C8  
PHDSL\_PSTBASOFF = 00000020  
PHDSL\_PTWSLELCK = 00000064  
PHDSW\_EXTADYNWS = 00000076  
PHDSW\_PTCNTLCK = 0000006C  
PHDSW\_WSDYN = 0000000E  
PHDSW\_WSLAST = 00000012  
PHDSW\_WSLIST = 00000008  
PHDSW\_WSLOCK = 0000000C  
PHDSW\_WSNEXT = 00000010  
PHDSW\_WSQUOTA = 00000018  
PHDSW\_WSSIZE = 00000050  
PR\$ IPL = 00000012  
PR\$ TBIS = 0000003A  
PRV\$V\_PSWAPM = 0000000C  
PTESC\_SRKW = 50000000  
PTESM\_VALID = 80000000  
PTESS\_OWN = 00000002  
PTESS\_PFN = 00000015  
PTESV\_OWN = 00000017  
PTESV\_PFN = 00000000  
PTESV\_TYPO = 00000016  
PTESV\_WINDOW = 00000015  
RETADR = 00000008  
SCH\$GL\_CURPCB \*\*\*\*\* X 04  
SCH\$GQ\_FPGWQ \*\*\*\*\* X 04  
SECSV\_RESIDENT \*\*\*\*\* X 04  
SECSW\_FLAGS \*\*\*\*\* X 04  
SETWSE 000001DC R 04  
SIZ... = 00000001  
SS\$ ACCVIO = 0000000C  
SS\$ LCKPAGFUL = 000000D4  
SS\$ LKWSETFUL = 00000194  
SS\$ NOPRIV = 00000024  
SS\$ NORMAL = 00000001  
SS\$ PAGOWNVIO = 000001EC  
SS\$ WASCLR = 00000001  
SS\$ WASSET = 00000009  
SWAPLOCK 000001A5 R 04  
SWAPWSLEBUG 000001EE R 04  
SWPSC\_KSTACK\_EX \*\*\*\*\* X 04  
SWPSC\_KSTACK\_EX\_WSL \*\*\*\*\* X 04  
SY\$ADJWSL \*\*\*\*\* X 03  
ULKGBLWSLE 00000054 R 04  
VASS\_BYTE = 00000009  
VASS\_VPG = 00000017  
VASV\_VPG = 00000009  
WQH\$Q\_WQCNT = 00000008  
WQH\$W\_WQSTATE = 0000000A  
WSL\$M\_PFNLOCK = 00000010  
WSL\$M\_WSLOCK = 00000020  
WSL\$S\_PAGTYP = 00000003

SY  
VO



SYSLKWSET  
Symbol table

D 5  
- LOCK/UNLOCK FROM WORKING SET/MEMORY

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WSL\$V\_PAGTYP = 00000001  
WSL\$V\_PFNLOCK = 00000004  
WSL\$V\_WSLOCK = 00000005

+-----+  
! Psect synopsis !  
+-----+

| PSECT name               | Allocation       | PSECT No. | Attributes  |
|--------------------------|------------------|-----------|---|
| . ABS .                  | 00000000 ( 0.)   | 00 ( 0.)  | NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE |
| \$AB\$\$                 | 00000000 ( 0.)   | 01 ( 1.)  | NOPIC USR CON ABS LCL NOSHR EXE RD WRT NCVEC BYTE       |
| \$\$\$210                | 00000004 ( 4.)   | 02 ( 2.)  | NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC LONG       |
| Y\$EXEPAGED              | 000000B1 ( 177.) | 03 ( 3.)  | NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE       |
| \$MMGCODE                | 000002EA ( 746.) | 04 ( 4.)  | NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE       |
| Z\$INIT\$PFN_FIXUP_TABLE | 0000001E ( 30.)  | 05 ( 5.)  | NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE       |

+-----+  
! Performance indicators !  
+-----+

| Phase                  | Page faults | CPU Time    | Elapsed Time |
|------------------------|-------------|-------------|--------------|
| Initialization         | 29          | 00:00:00.06 | 00:00:00.50  |
| Command processing     | 106         | 00:00:00.52 | 00:00:01.84  |
| Pass 1                 | 384         | 00:00:13.59 | 00:00:32.50  |
| Symbol table sort      | 0           | 00:00:02.19 | 00:00:03.65  |
| Pass 2                 | 162         | 00:00:03.15 | 00:00:06.25  |
| Symbol table output    | 16          | 00:00:00.12 | 00:00:00.22  |
| Psect synopsis output  | 1           | 00:00:00.04 | 00:00:00.37  |
| Cross-reference output | 0           | 00:00:00.00 | 00:00:00.00  |
| Assembler run totals   | 700         | 00:00:19.67 | 00:00:45.33  |

The working set limit was 1500 pages.  
80740 bytes (158 pages) of virtual memory were used to buffer the intermediate code.  
There were 70 pages of symbol table space allocated to hold 1392 non-local and 49 local symbols.  
852 source lines were read in Pass 1, producing 34 object records in Pass 2.  
31 pages of virtual memory were used to define 29 macros.

+-----+  
! Macro library statistics !  
+-----+

| Macro library name                  | Macros defined |
|-------------------------------------|----------------|
| -\$255\$DUA28:[SYS.OBJ]LIB.MLB;1    | 17             |
| -\$255\$DUA28:[SYSLIB]STARLET.MLB;2 | 9              |
| TOTALS (all libraries)              | 26             |

1553 GETS were required to define 26 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS\$:SYSLKWSET/OBJ=OBJ\$:SYSLKWSET MSRC\$:SYSLKWSET/UPDATE=(ENH\$:SYSLKWSET)+EXECML\$/LIB



0386 AH-BT13A-SE  
VAX/VMS V4.0

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